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"Thoughts on the Application of the Principles of 'Natural Selection' and 'Inheritance' to Political Society" did not particularly stress the importance of the biological terms he at times employed. Although in one passage Bagehot refers to natural selection among animals and in human history as "identical in essence," he nevertheless in the very next paragraph remarks concerning his use of the term: "At all events to the sort of application here made of it [*i. e.*, in 'Physics and Politics'], which only amounts to searching out and following up an analogy suggested by it, there is plainly no objection." Bagehot points out, as does Keller, the fact that differences in customs affect the efficiency of rival groups and may thereby indirectly affect the chances of survival possessed by their observers. Bagehot went on, as does Keller also, to treat in a very broad way the relation of custom, of unconscious imitation, of reason and of many other factors to the survival and progress of groups and nations. Bagehot did this, however, without at all falling into the confusion necessarily produced by ignoring or rather obliterating by a *tour de force* the plain distinction between natural selection in the strict Darwinian sense and the same term loosely used for natural conscious or unconscious social choices. Transference of biological terms into the sociological field and use of them in the literal fashion employed by Professor Keller does not offend so seriously in "reasoning by analogy" as it does in what seems to the reviewer a misleading and scientifically illegitimate use of precise biological terms. There is no need to repeat in a somewhat different form the sort of thing which followed Spencer's application of the term organism to society.

The foregoing criticism, however, is very largely one of terminology and the careful reader will find much of great value in Professor Keller's book. The differences among customs, the ways in which various customs have originated, the effects of conscious and unconscious imitation, the relation of suggestion, of conflict and of reason to the development of specific customs—these and other spe-

cial subjects are presented and illustrated in an interesting fashion.

A. A. TENNEY

PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES

THE ninth number of Volume 1 of the *Proceedings of the National Academy of Sciences* contains the following articles:

1. *The Indian and Nature*: ALICE C. FLETCHER, Peabody Museum, Harvard University.

Glimpses are given of the line the Indian pursues in his endeavor to express his view of nature and of the relation he believes to exist between its various forms and forces and himself.

2. *The Mechanism of Antagonistic Salt Action*: JACQUES LOEB, Rockefeller Institute for Medical Research, New York.

The author studies the effect of the concentration  $C_{III}$  of the salt at the external surface of membranes in addition to the concentrations  $C_I$  and  $C_{II}$  of the salt outside and inside the membrane and finds that  $C_{III}$  is serviceable in explaining the mechanism of antagonistic salt action in certain cases.

3. *The Nitrogen Problem in Arid Soils*: CHAS. B. LIPMAN, College of Agriculture, University of California.

A summary of some recent investigations and field manifestations with reference to their bearing on problems of soil fertility in California.

4. *A Notation for Use in the Discussion of Star Colors*: FREDERICK H. SEARES, Mount Wilson Solar Observatory, Carnegie Institution of Washington.

The extension of absolute scales of photographic and photovisual magnitudes to the fainter stars provides a method of determining the colors of objects at present beyond the reach of spectroscopic investigation and it is convenient in the statistical discussion of such color results to introduce a notation similar to that used for spectral classification. The letters *b*, *a*, *f*, *g*, etc., are used to correspond to *B*, *A*, *F*, *G*, etc.

5. *Distribution of Colors among the Stars of N. G. C. 1647 and M. 67*: FREDERICK H. SEARES and HARLOW SHAPLEY, Mount Wilson Solar Observatory, Carnegie Institution of Washington.

Neither N. G. C. 1647 nor M 67 show any dependence of condensation upon color which can not be explained on the basis of included background stars; there seems to be little, if any, dependence of condensation upon magnitude; but there is a marked relation between color and magnitude in N. G. C. 1647 and a less pronounced relation in M 67.

6. *On Thiele's "Phase" in Band Spectra*: HORACE SCUDDER UHLER, Sloane Physical Laboratory, Yale University.

The author outlines an interpolation method for determining  $c$  in the formula  $\lambda = f[(n + c)^2]$ , which is much simpler than using Thiele's complicated formula.

7. *Why Polar Bodies Do Not Develop*: EDWIN G. CONKLIN, Department of Biology, Princeton University.

The second or internal factor in normal fertilization is a non-diffusible substance which is introduced by the spermatozoon, and it is strongly suggested that this factor is the sperm centrosome, a position which Boveri has long maintained and which the author has hitherto contested. Giant polar bodies do not develop because they are not fertilized and they are not fertilized because they are generally formed after a spermatozoon has entered the egg and has rendered it impervious to other spermatozoa.

8. *Radical Velocities of the Planetary and Irregular Nebulae*: W. W. CAMPBELL and J. H. MOORE, Lick Observatory, University of California.

The fact that the gaseous nebulae have motions which are characteristic of the stars, and their concentration in the Milky Way, indicate that these nebulae are members of our stellar system. The great velocities of the nebulae in the Magellanic Clouds and other considerations lead to the hypothesis that the Magellanic Clouds are isolated cosmic units with no apparent connection with our own stellar system.

E. B. WILSON

#### SOME CORRELATIONS BETWEEN VEGETATION AND SOILS, INDICATED BY CENSUS STATISTICS

ALTHOUGH most persons who have lived or traveled extensively in the rural districts of the eastern United States have probably noticed that the proportion of evergreens in the forests is usually greatest on the poorest soils, and *vice versa*, one rarely sees any mention of such a correlation in scientific, especially ecological, literature. Most plant ecologists who have taken notice of evergreens at all seem to try to correlate them with climate in some way; but the easily demonstrated fact that two areas so close together or so similarly situated that they must have essentially the same climate often differ greatly in their percentage of evergreens shows that climate is not the only factor.<sup>1</sup>

The making of definite correlations between evergreens (or other aspects of vegetation) and soils has always been difficult on account of the dearth of quantitative data. No reliable quantitative analysis of the vegetation of a whole state has yet been made, and it would take many years to do such a piece of work thoroughly. To estimate the average composition, either physical or chemical, of the soils of an area of more than a few square miles would be even more difficult, for no matter how many samples were collected and analyzed, the judgment of the persons selecting them would always introduce a "personal equation" factor, unless the samples were selected wholly fortuitously, or at regular intervals (for example, at the corners or centers of every section of land).

Our knowledge of the chemical composition of the soils of the United States is still far from satisfactory. In Bulletins 57 and 85 of the U. S. Bureau of Soils are summed up most of the available chemical analyses, by states, and for some states there are only two or three, and those probably not typical; and they are not all made by the same methods. In fact soil investigators are not yet agreed on what method gives the best indication of

<sup>1</sup> In this connection see Torreya 13: 244. 1913, *Rep. Mich. Acad. Sci.*, 15: 196-197, 1914; *Ann. Rep. Fla. Geol. Surv.*, 6: 175, 393-396, 1914.